

<b>Substitute for form 1449A-B/PTO</b>  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (use as many sheets as necessary)	<b>Complete if Known</b>	
	Application Number	<b>Unknown</b>
	Filing Date	<b>January 21, 2000</b>
	First Named Inventor	<b>Jeremy Minshull</b>
	Group Art Unit	<b>Unknown</b>
	Examiner Name	<b>Unknown</b>
Attorney Docket Number		<b>02-020622US</b>

1525 U.S. PTO  
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01/24/00

U.S. PATENT DOCUMENTS						
Examiner Initials	Cite No.	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, lines, Where Relevant Passages or Relevant Figures Appeal
		Number	Kind Code (if known)			

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OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS				
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.		T
EW	AA	Ji, Guangyung and Silver, Simon, (1992) "Reduction of arsenate to arsenite by the ArsC protein of the arsenic resistance operon of Staphylococcus aureus plasmid p1258" <u>PNAS</u> 89:9474-9478.		
EW	AB	Silver, Simon (date unknown) "Resistance Systems and Detoxification of Toxic Heavy Metals" <u>Unknown</u> :308-339.		


Examiner Signature	<i>EW</i>	Date Considered	6/29/01
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Substitute for form 1449A-B/PTO  INFORMATION DISCLOSURE STATEMENT BY APPLICANT  (use as many sheets as necessary)	Complete if Known	
	Application Number	09/189,103
	Filing Date	November 9, 1998
	First Named Inventor	Jeremy Minshull
	Group Art Unit	1635
	Examiner Name	Unassigned
	Attorney Docket Number	02-020620US

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gm	AD	5,605,793		Stemmer	02-25-1997	
↓	AE	5,811,238		Stemmer et al.	09-22-1998	

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	AF	WO	95/17413		--English Translation	06/29/1995		

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	First Named Inventor	Jeremy Minshull
	Group Art Unit	1655
	Examiner Name	Whisenant, E.
Attorney Docket Number	02-020620US	

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		Number	Kind Code (if known)			
EW	AA	5,939,250		Short, Jay M.	08-17-1999	
	AB	5,958,672		Short, Jay M.	09-28-1999	
	AC	5,965,408		Short, Jay M.	10-12-1999	

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		Office	Number	Kind Code (if known)				
EW	AD	WO	97/35966		Maxygen, Inc.	10-02-1997		
↓	AE	WO	98/13485		Maxygen, Inc.	04-02-1998		
	AF	WO	98/13487		Maxygen, Inc.	04-02-1998		
	AG	WO	98/27230		Maxygen, Inc.	06-25-1998		
	AH	WO	98/31837		Maxygen, Inc.	07-23-1998		
	AI	WO	98/36080		Maxygen, Inc.	08-20-1998		
	AJ	EP	0911396A2		Maxygen, Inc.	04-28-1999		
	AK	WO	99/21979		Maxygen, Inc.	05-06-1999		
	AL	EP	0911396A3		Maxygen, Inc.	05-06-1999		
	AM	WO	99/23107		Maxygen, Inc.	05-14-1999		
	AN	EP	0934999A1		Maxygen, Inc.	08-11-1999		

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EW	AA	5,834,252		Stemmer et al.	11-10-1998	
	AB	5,928,905		Stemmer et al.	07-27-1999	
	AC	5,976,862		Kauffman et al.	11-02-1999	


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	Group Art Unit	1635
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	Attorney Docket Number	02-020620US

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## U.S. PATENT DOCUMENTS

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## FOREIGN PATENT DOCUMENTS

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<b>AD</b> <i>ew</i>	<b>AD</b>	<b>CRAMERIA ET AL: "Molecular evolution of an arsenate detoxification pathway by DNA shuffling" NATURE BIOTECHNOLOGY, vol. 15, May 1997, pages 436-438, XP002082183</b>	

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FORM PTO-1449 (Modified)		Attorney Docket No. 18097-020600	Serial No.: 08/650,400	
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)		Applicant: JEREMY MINSHULL et al.		
		Filing Date: 05/20/96	Group: 1634	

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U.S. PATENT DOCUMENTS						
Examiner Initial	Document No.	Date	Name	Class	Sub-class	Filing Date (If Appropriate)
AA	5,032,514	7/16/91	Anderson et al.	435	138	08/08/88
AB	5,093,257	03/03/92	Gray	435	202	11/01/89
AC	5,652,116	07/29/97	Grandi et al.	435	69.1	07/06/94
AD	5,223,408	06/29/93	Goeddel et al.	435	69.3	07/11/91
AE	5,360,728	11/01/98	Prasher, D.	435	189	12/01/92
AF	5,541,309	07/30/96	Prasher, D.	536	23.2	10/28/94
AG	5,356,801	10/18/94	Rambosek et al.	435	195	07/09/93
AH	5,279,952	08/27/94	Wu, K.C.	435	172.3	08/09/91

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	Document No.	Date	Country	Class	Sub-class	Translation (yes/no)
AI	0 252666 B1	01/13/88	Europe	7	7	Yes
AJ	WO 90/07576	07/12/90	PCT			Abstract
AK	WO 91/01087	02/07/91	PCT			Yes
AL	WO 95/17413	06/29/95	PCT			Abstract
AM	WO 97/07205	02/27/97	PCT			Yes
AN	WO95/22625	8/24/95	PCT			Yes

OTHER ART (Including Author, Title, Date, Pertinent Pages, Etc.)	
AO	Appleyard, V.C.L. et al., "Secondary metabolite production in filamentous fungi displayed," <u>Mol. Gen. Gent.</u> 247:338-342 (1995)
AP	Arkin et al., "AN ALGORITHM FOR PROTEIN ENGINEERING: SIMULATIONS OF RECURSIVE ENSEMBLE MUTAGENESIS" <u>Proc. Natl. Acad. Sci. USA</u> 89:7811-7815 (1992).
AQ	Armstrong, G.A., "Eubacteria Show Their True Colors: Genetics of Carotenoid Pigment Biosynthesis from Microbes to Plants," <u>J. Bacteriol.</u> 176(16):4795-4802 (1994)
AR	Arnold, F.H., "Protein engineering for unusual environments," <u>Cr. Opin. Biotechnol.</u> 4:450-455 (1993)
AS	Backman, K. et al., "Genetic Engineering of Metabolic Pathways Applied to the Production of Phenylalanine," <u>Ann. NY Acad. Sci.</u> 589:16-24 (1990)

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		Filing Date: 05/20/96	Group: 1634
<input checked="" type="checkbox"/> AT	Bailey, J.E., "Toward a Science of Metabolic Engineering," <u>Science</u> 252:1668-1675 (1991)		
<input type="checkbox"/> AU	Beaudry et al., "DIRECTED EVOLUTION OF AN RNA ENZYME" <u>Science</u> 257:635-641 (1992).		
<input type="checkbox"/> AV	Berger et al., "PHOENIX MUTAGENESIS: ONE-STEP REASSEMBLY OF MULTIPLY CLEAVED PLASMIDS WITH MIXTURES OF MUTANT AND WILD-TYPE FRAGMENTS" <u>Anal. Biochem</u> 214:571-579 see pages 571-578 (1993).		
<input type="checkbox"/> AW	Berkhout et al., "IN VIVO SELECTION OF RANDOMLY MUTATED RETROVIRAL GENOMES" <u>Nucleic Acids Research</u> 21:5020-5023 Number 22 (1993).		
<input type="checkbox"/> AX	Botella, J.A. et al., "A cluster of structural and regulatory genes for light-induced carotenogenesis in <i>Myxococcus xanthus</i> ," <u>Eur. J. Biochem.</u> 233:238-248 (1995)		
<input type="checkbox"/> AY	Boudrant, J., "Microbial processes for ascorbic acid biosynthesis: a review," <u>Enzyme Microb. Technol.</u> 12:322-329 (1990)		
<input type="checkbox"/> AZ	Brenner, V. et al., "Genetic construction of PCB degraders," <u>Biodegradation</u> 5:359-377 (1994)		
<input type="checkbox"/> BA	Bryant, C. et al., "Cloning, Nucleotide Sequence, and Expression of the Nitroreductase Gene from <i>Enterobacter Cloacae</i> ," <u>J. Biol. Chem.</u> 266(7):4126-4130 (1991)		
<input type="checkbox"/> BB	Cadwell et al., "RANDOMIZATION OF GENES BY PCR MUTAGENESIS" <u>PCR Methods and Applications</u> 2:28-33 (1992).		
<input type="checkbox"/> BC	Cameron, D.C. et al., "Cellular and Metabolic Engineering," <u>Applied Biochem. Biotech.</u> 38:105-140 (1993)		
<input type="checkbox"/> BD	Chakrabarty, A.M., "Microbial Degradation of Toxic Chemicals: Evolutionary Insights and Practical Considerations," <u>Am. Soc. Micro. Biol. News</u> 62:130-137 (1996)		
<input type="checkbox"/> BE	Chater, K.F., "The improving prospects for yield increase by genetic engineering in antibiotic-producing streptomycetes," <u>Bio/Technology</u> 8:115-121 (1990)		
<input type="checkbox"/> BF	Chen, C.W. et al., "Cloning and Expression of a DNA sequence conferring cepamycin C production," <u>Bio/Technology</u> 6:1222-1224 (1988)		
<input type="checkbox"/> BG	Chen, K. et al., "Tuning the activity of an enzyme for unusual environments: Sequential random mutagenesis of subtilisin E for catalysis in dimethylformamide," <u>Proc. Natl. Acad. Sci. U.S.A.</u> 90:5618-5622 (1993)		
<input type="checkbox"/> BH	Calogero Sabina et al., "In Vivo Recombination and the Production of Hybrid Genes," <u>Microbiology letters</u> , 1992, Volume 97, pp. 41-44.		
<input checked="" type="checkbox"/> BI	Caren Robert et al., "Efficient Sampling of Protein Sequence Space for Multiple Mutants," <u>Biotechnology</u> , May 12, 1994, Volume 12, pp. 517-520.		

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BJ	Dacre, J.C., "Nonspecificity of the Gibbs Reaction," <u>Anal. Chem.</u> 43(4):589-591 (1971)		
BK	Denome, S.A. et al., "Dibenzothiophene and Naphthalene in <i>Pseudomonas</i> Strains: Complete DNA Sequence of an Upper Naphthalene Catabolic Pathway," <u>J. Bacteriol.</u> 175(21):6890-6901 (1993)		
BL	de Souza, M.L. et al., "Cloning, Characterization, and Expression of a Gene Region from <i>Pseudomonas</i> sp. Strain ADP Involved in the Dechlorination of Atrazine," <u>Appl. Environ. Micro.</u> 61(9):3373-3378 (1995)		
BM	Delagrave Simon et al., "Recursive Ensemble Mutagenesis," <u>Protein Engineering</u> , 1993, Volume 6, Number 3, pp. 327-331.		
BN	Eaton, R.W. et al., "Formation of Indigo and Related Compounds from Indolecarboxylic Acids by Aromatic Acid-Degrading Bacteria: Chromogenic Reactions for Cloning Genes Encoding Dioxygenases That Act on Aromatic Acids," <u>J. Bacteriol.</u> 177(23):6983-6988 (1995)		
BO	Erickson B.D. et al., "Enhanced Biodegradation of Polychlorinated Biphenyls after Site-Directed Mutagenesis of a Biphenyl Dioxygenase Gene," <u>App. Environ. Micro.</u> 59(11):3858-3862 (1993)		
BP	Evnnin, L.B. et al., "Substrate specificity of trypsin investigated by using a genetic selection," <u>Proc. Natl. Acad. Sci. U.S.A.</u> 87:6659-6663 (1990)		
BQ	Fernandez-Lafuente R. et al., "Additional stabilization of penicillin G acylase-agarose derivatives by controlled chemical modification with formaldehyde," <u>Enzyme Microb. Technol.</u> 14:489-495 (1992)		
BR	Ford, T. et al., "Metal-microbe interactions," <u>Bioextraction and Biodeterioration of Metals</u> , p. 1-23		
BS	Furukawa K. et al., "Gene-specific transposon mutagenesis of the biphenyl/polychlorinated biphenyl-degradation-controlling <i>bph</i> operon in soil bacteria," <u>Gene</u> 98:21-28 (1991)		
BT	Furukawa K. et al., "Gene Components Responsible for Discrete Substrate Specificity in the Metabolism of Biphenyl ( <i>bph</i> Operon) and Toluene ( <i>tod</i> Operon), <u>J. Bact.</u> 175(16):5224-5232 (1993)		
BU	Furukawa K. et al., "Efficient Degradation of Trichloroethylene by a Hybrid Aromatic Ring Dioxygenase," <u>J. Bacteriol.</u> 176(7):2121-2123 (1994)		
BV	Goguen, B. et al., "Clonogenic cytotoxicity testing by microdrop encapsulation," <u>Nature</u> 363:189-190 (1995)		
BW	Hart, H.E. et al., "Scintillation proximity assay (SPA) - a new method of immunoassay," <u>Mol. Immunol.</u> 16:265-267 (1979)		
BX	Hassan, H.M. et al., "Intracellular Production of Superoxide Radical and of Hydrogen Peroxide by Redox Active Compounds," <u>Arch. Bioch. Biop.</u> 196(2):385-395 (1979)		

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CA	Hayase N. et al., "Pseudomonas putida KF715 bphABCD Operon Encoding Biphenyl and Polychlorinated Biphenyl Degradation: Cloning, Analysis, and Expression in Soil Bacteria," <u>J. Bacteriol.</u> 172(2):1160-1164 (1990)		
CB	Hermes et al., "SEARCHING SEQUENCE SPACE BY DEFINABLY RANDOM MUTAGENESIS: IMPROVING THE CATALYTIC POTENCY OF AN ENZYME" <u>Proc. Natl. Acad. Sci. USA</u> 87:696-700 (1990).		
CC	Heim et al., "Wavelength Mutations and Posttranslational Autoxidation of Green Fluorescent Protein," <u>Proc. Natl. Acad. Sci. USA</u> 501-12504 (1994).		
CD	Hofer, B. et al., "The biphenyl/polychlorinated biphenyl-degradation locus (bph) of <i>Pseudomonas</i> sp. LB400 encodes four additional metabolic enzymes," <u>Gene</u> 144:9-16 (1994)		
CE	Hopwood, D.A., "Antibiotics: opportunities for genetic manipulation," <u>Phil. Trans. R. Soc. Lond.</u> B324:549-562 (1989)		
CF	Hoshino T. et al., "Molecular Cloning and Sequence Analysis of the crtB Gene of <i>Thermus Thermophilus</i> HB27, an Extreme Thermophile Producing Carotenoid Pigments," <u>Appl. Environ. Micro.</u> 59(9):3150-3153 (1993)		
CG	Hunter, C.N. et al., "Introduction of New Carotenoids into the Bacterial Photosynthetic Apparatus by Combining the Carotenoid Biosynthetic Pathways of <i>Erwinia herbicola</i> and <i>Rhodobacter sphaeroides</i> ," <u>J. Bacteriol.</u> 176(12):3692-3697 (1994)		
CH	Hutchinson, C.R., "Prospects for the Discovery of New (Hybrid) Antibiotics by Genetic Engineering of Antibiotic-Producing Bacteria," <u>Med. Res. Rev.</u> 8(4):557-567 (1988)		
CI	Hutchinson, C.R. et al., "Drug Development through the Genetic Engineering of Antibiotic-Producing Microorganisms," <u>Ann. NY Acad. Sci.</u> 656:78-93 (1991)		
CJ	Hutchinson, C.R., "Drug Synthesis by Genetically Engineered Microorganisms," <u>Bio/Technology</u> 12:375-308 (1994)		
CK	Ji, G. et al., "Bacterial resistance mechanisms for heavy metals of environmental concern," <u>J. Ind. Micro.</u> 14:61-75 (1995)		
CL	Jones et al., "Recombinant Circle PCR and Recombination PCR for Site-Specific Mutagenesis Without PCR Product Purification," <u>BioTechniques</u> 12(4): pp.528-534 (1992).		
CM	Kim et al., "HUMAN IMMUNODEFICIENCY VIRUS REVERSE TRANSCRIPTASE" <u>The Journal of Biological Chemistry</u> 271, No. 9 pp. 4872-4878 (1996).		
CN	Kajiwara, S. et al., "Isolation and functional identification of a novel cDNA for astaxanthin biosynthesis from <i>Haematococcus pluvialis</i> , and astaxanthin synthesis in <i>Escherichia coli</i> ," <u>Plant Mol. Bio.</u> 29:343-352 (1995)		

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		Filing Date: 05/20/96	Group: 1634
CO	Kato, F. et al., "Carotenoid synthesis in <i>Streptomyces setonii</i> ISP5395 is induced by the gene <i>crtS</i> , whose product is similar to a sigma factor," <u>Mol. Gen. Genet.</u> 247:387-390 (1995)		
CP	Kellogg, S.T. et al., "Plasmid Assisted Molecular Breeding: New Technique for Enhanced Biodegradation of Persistent Toxic Chemicals," <u>Science</u> 214:1133-1135 (1981)		
CQ	Kleinkauf, H. et al., "A nonribosomal system of peptide biosynthesis," <u>Eur. J. Biochem.</u> 236:335-351 (1996)		
CR	Krawiec, S., "Bacterial desulfurization of thiophenes: screening techniques and some speculations regarding the biochemical and genetic bases," <u>Devl. Indust. Microbiol.</u> 31:103-114 (1990)		
CS	Lang, H.P. et al., "Complete DNA Sequence, Specific Tn5 Insertion Map, and Gene Assignment of the Carotenoid Biosynthesis Pathway of <i>Rhodobacter sphaeroides</i> ," <u>J. Bacteriol.</u> 177(8):2064-2073 (1995)		
CT	Leung et al., "A METHOD FOR RANDOM MUTAGENESIS OF A DEFINED DNA SEGMENT USING A MODIFIED POLYMERASE CHAIN REACTION" 1:11-15, see pp. 11-14 (1989).		
CU	Liao, J.C., "Modelling and analysis of metabolic pathways," <u>Curr. Opin. Biotech.</u> 4:211-216 (1993)		
CV	Mandelbaum, R.T. et al., "Isolation and Characterization of a <i>Pseudomonas</i> sp. That Mineralizes the s-Triazine Herbicide Atrazine," <u>Appl. Environ. Micro.</u> 61(4):1451-1457 (1995)		
CW	Marks James et al., "BY-PASSING IMMUNIZATION: BUILDING HIGH AFFINITY HUMAN ANTIBODIES BY CHAIN SHUFFLING" <u>Bio/Technology</u> 10:779-782 (1992).		
CX	Marrs, B., "Mobilization of the Genes for Photosynthesis from <i>Rhodospseudomonas capsulata</i> by a Promiscuous Plasmid," <u>J. Bacteriol.</u> 146(3):1003-1012 (1981)		
DA	Martin, L. et al., "Cloning and sequencing of the <i>pac</i> gene encoding he penicillin G acylase of <i>Bacillus megaterium</i> ATCC 14945," <u>FEMS Microbiol. Lett.</u> 125:287-292 (1995)		
DB	Matthysse, A.G. et al., "Genes Required for Cellulose Synthesis in <i>Agrobacterium tumefaciens</i> ," <u>J. Bacteriol.</u> 177(4):1069-1075 (1995)		
DC	McDaniel, R. et al., "Engineered Biosynthesis of Novel Polyketides," <u>Science</u> 262:1546-1550 (1995)		
DD	Meyerhans Andreas et al., "DNA Recombination during PCR," <u>Nucleic Acids Research</u> , 1990, Volume 18, Number 7, pp. 1687-1691.		
DE	Misawa, N. et al., "Structure and Functional Analysis of a Marine Bacterial Carotenoid biosynthesis Gene Cluster and Astaxanthin Biosynthetic Pathway Proposed at the Gene Level," <u>J. Bacteriol.</u> 177(22):6576-6584 (1995)		
DF	Moore, J.C. et al., "Directed evolution of a para-nitrobenzyl esterase for aqueous-organic solvents," <u>Nature Biotechnology</u> 14:458-467 (1996)		

FORM PTO-1449 (Modified)		Attorney Docket No. 18097-020600	Serial No.: 08/650,400
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)		Applicant: JEREMY MINSHULL et al.	
		Filing Date: 05/20/96	Group: 1634
<input checked="" type="checkbox"/> DG	Murdock, D. et al., "Construction of Metabolic Operons Catalyzing the De Novo Biosynthesis of Indigo in <i>Escherichia coli</i> ," <u>Bio/Technology</u> 11:381-386 (1993)		
<input type="checkbox"/> DH	Nisbet, L.J. et al., "Developments in Microbial Products Screening," <u>Ann. Rep. Med. Chem.</u> 21:149-157 (1986)		
<input type="checkbox"/> DI	Oliphant et al., "CLONING OF RANDOM-SEQUENCE OLIGODEOXYNUCLEOTIDES" <u>Gene</u> 44:177-183 (1988).		
<input type="checkbox"/> DJ	Omura, S., "Philosophy of new Drug Discovery," <u>Microbio. Rev.</u> 50(3):259-279 (1986)		
<input type="checkbox"/> DK	Paau, A.S., "Improvement of <i>Rhizogium</i> Inoculants by Mutation, Genetic Engineering and Formulation," <u>Biotech. Adv.</u> 9:173-184 (1991)		
<input type="checkbox"/> DL	Piepersberg, W., "Pathway Engineering in Secondary Metabolite-Producing Actinomycetes," <u>Crit. Rev. Biotechnol.</u> 14:251-285 (1994)		
<input type="checkbox"/> DM	Poirier, Y. et al., "Polyhydroxybutyrate, a Biodegradable Thermoplastic, Produced in Transgenic Plants," <u>Science</u> 256:520-523 (1992)		
<input type="checkbox"/> DN	Pompon Denis et al., "Protein Engineering by cDNA Recombination in Yeasts: Shuffling of Mamalian Cytochrome P-450 Functions," <u>Gene</u> , 1989, Volume 83. pp. 15-24.		
<input type="checkbox"/> DO	Powell, K.T. et al., "Gel microdroplets and flow cytometry: Rapid determination of antibody secretion by individual cells within a cell population," <u>Bio/Technology</u> 8:333-337 (1990)		
<input type="checkbox"/> DP	Rawlings, D.E. et al., "Mining with Microbes," <u>Bio/Technology</u> 13:773-778 (1995)		
<input type="checkbox"/> DQ	Rees, W.D. et al., "A molecular biological approach to reducing dietary amino acid needs," <u>Bio/Technology</u> 8:629-633 (1990)		
<input type="checkbox"/> DR	Reidhaar-Olson et al., "COMBINATORIAL CASSETTE MUTAGENESIS AS A PROBE OF THE INFORMATIONAL CONTENT OF PROTEIN SEQUENCES" <u>Science</u> 241:53-57 (1988).		
<input type="checkbox"/> DS	Roa et al., RECOMBINATION AND POLYMERASE ERROR FACILITATE RESTORATION OF INFECTIVITY IN BROME MOSAIC VIRUS" <u>Journal of Virology</u> No. 2 67:969-979 (1993).		
<input type="checkbox"/> DT	Sanseverino, J. et al., "Plasmid-Mediated Mineralization of Naphthalene, Phenanthrene, Anthracene," <u>Applied Environ. Micro.</u> 59(6):1931-1937 (1993)		
<input type="checkbox"/> DU	Sarchy, A.V. et al., "Expression of the <i>Escherichia coli</i> Xylose Isomerase Gene in <i>Saccharomyces cerevisiae</i> ," <u>Appl. Environ. Micro.</u> 53(9):1996-2000 (1987)		
<input type="checkbox"/> DV	Scherrer, S. et al., "Periplasmic aggregation limits the proteolytic maturation of the <i>Escherichia coli</i> Penicillin G amidase precursor polypeptide," <u>Appl. Microbiol. Biotechnol.</u> 42:85-91 (1994)		
<input type="checkbox"/> DW	Selifonova, O.V. et al., "Use of an <i>ibp-lux</i> Fusion To Study Regulation of the Isopropylbenzene Catabolism Operon of <i>Pseudomonas putida</i> RE204 and To Detect Hydrophobic Pollutants in the Environment," <u>Appl. Environ. Microbiol.</u> 62(3):778-783 (1986)		

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<input checked="" type="checkbox"/> DX	Silver, S. et al., "Newer Systems for Bacterial Resistances to Toxic Heavy Metals," <u>Environ. Health Perspect.</u> 102:107-113 (1994)		
<input type="checkbox"/> DY	Simon, M.J. et al., "Sequences of genes encoding naphthalene dioxygenase in <i>Pseudomonas putida</i> strains G7 and NCIB 9816-4," <u>Gene</u> 127:31-37 (1993)		
<input type="checkbox"/> DZ	Simpson, T.W. et al., "Two paradigms of metabolic engineering applied to amino acid biosynthesis," <u>Biochem. Soc. Trans.</u> 23:381-387 (1995)		
<input type="checkbox"/> EA	Smith, D.J. et al., "Cloning and heterologous expression of the penicillin biosynthetic gene cluster from <i>penicillium chrysogenum</i> ," <u>Bio/Technology</u> 8:39-41 (1990)		
<input type="checkbox"/> EB	Steele, D.B. et al., "Techniques for selection of industrially important microorganisms," <u>Ann. Rev. Microbiol.</u> 45:89-106 (1991)		
<input type="checkbox"/> EC	Stemmer, W.P.C., "Rapid Evolution of a Protein In Vitro by DNA Shuffling," <u>Nature</u> 370:389-391 (1994).		
<input type="checkbox"/> ED	Stemmer, W.P.C., "DNA Shuffling by Random Fragmentation and Reassembly: In Vitro Recombination for Molecular Evolution," <u>Proc. Natl. Acad. Sci. U.S.A.</u> 91:10747-10751 (1994).		
<input type="checkbox"/> EE	Stemmer et al., "SELECTION OF AN ACTIVE SINGLE CHAIN FV ANTIBODY FROM A PROTEIN LINKER LIBRARY PREPARED BY ENZYMATIC INVERSE PCR" <u>BIOTECHNIQUES</u> 14:256-265 (1992).		
<input type="checkbox"/> EF	Stephanopoulos, G. et al., "Metabolic engineering - methodologies and future prospects," <u>Trends. Biotech.</u> 11:392-396 (1993)		
<input type="checkbox"/> EG	Stephanopoulos, G., "Metabolic engineering," <u>Curr. Opin. Biotech.</u> 5:196-200 (1994)		
<input type="checkbox"/> EH	Tabata, K. et al., "A carotenogenic gene cluster exists on a large plasmid in <i>Thermus thermophilus</i> ," <u>FEBS Letts.</u> 341:251-255 (1994)		
<input type="checkbox"/> EI	Timmis, K.N. et al., "Designing microorganisms for the Treatment of Toxic Wastes," <u>Ann. Rev. Microbiol.</u> 48:525-557 (1994)		
<input type="checkbox"/> EJ	Wackett, L.P. et al., "Metabolism of polyhalogenated compounds by a genetically engineered bacterium," <u>Nature</u> 368:627-629 (1994)		
<input type="checkbox"/> EK	Wang et al., "Identification of Glial Filament Protein and Vimentin in the Same Intermediate Filament System in Human Glioma Cells," <u>Proc. Natl. Sci. USA</u> 81(7):2102-2106 (Abstract only, 1984)		
<input type="checkbox"/> EL	Wang, Y et al., "Nucleotide Sequence of a Chromosomal Mercury Resistance Determinant from a <i>Bacillus</i> sp. With Broad-Spectrum Mercury Resistance," <u>J. Bacteriol.</u> 171(1):83-92 (1989)		
<input checked="" type="checkbox"/> EM	Weber, H. et al., "Formation of Genes Coding for Hybrid Proteins by Recombination Between Related, Cloned Genes in <i>E. Coli</i> ," <u>Nucleic Acids Research</u> 11(16): 5661-5669 (1983)		

FORM PTO-1449 (Modified)		Attorney Docket No. 18097-020600	Serial No.: 08/650,400
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		Filing Date: 05/20/96	Group: 1634
<input checked="" type="checkbox"/> EN	Weaver, J.C. et al., "Microdrop Technology: A General Method for Separating Cells by Function and Composition," <u>Methods</u> 2:234-247 (1991)		
<input type="checkbox"/> EO	Wehmeier, U.F., "New multifunctional <i>Escherichia coli</i> - <i>Streptomyces</i> shuttle vectors allowing blue-white screening on Xgal plates," <u>Gene</u> 165:149-150 (1995)		
<input type="checkbox"/> EP	Zhao, X., "EPD, a novel technology for drug delivery," <u>Adv. Drug Delivery Rev.</u> 17:257-262 (1995)		
<input type="checkbox"/> EQ	Zukowski, M.M. et al., "Chromogenic identification of genetic regulatory signals in <i>Bacillus subtilis</i> based on expression of a cloned <i>Pseudomonas</i> gene," <u>Proc. Natl. Acad. Sci. U.S.A.</u> 80:1101-1105 (1983)		
<input checked="" type="checkbox"/> ER	Zylstra, G.J. et al., "Cloning and Analysis of the Genes for Polycyclic Aromatic Hydrocarbon Degradation," <u>Ann. NY Acad. Sci.</u> 721:386-398 (1994)		

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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FORM PTO-1449 (Modified)

Attorney Docket No.  
18097-020600Serial No.:  
08/650,400LIST OF PATENTS AND PUBLICATIONS FOR  
APPLICANT'S INFORMATION DISCLOSURE  
STATEMENT  
(Use several sheets if necessary)

Applicant: JEREMY MINSHULL et al.

Filing Date: 5/20/96

Group: 1807

10525 U.S. PTO  
09/490643

01/24/00

## Reference Designation

## U.S. PATENT DOCUMENTS

Examiner Initial	Document No.	Date	Name	Class	Sub-class	Filing Date (if Appropriate)
___ AA						
___ AB						
___ AC						
___ AD						
___ AE						
___ AF						
___ AG						
___ AH						
___ AI						
___ AJ						
___ AK						
___ AL						

## FOREIGN PATENT DOCUMENTS

	Document No.	Date	Country	Class	Sub-class	Translation (yes/no)
___ AM						
___ AN						
___ AO						
___ AP						
___ AQ						

## OTHER ART (Including Author, Title, Date, Pertinent Pages, Etc.)

h AR	Dieffenbach et al., <u>PCR Primer. A Laboratory Manual</u> , New York, Cold Spring Harbor Press, pp. 581-621 (1995)
AS	Higuchi, R., "Using PCT to Engineer DNA," <u>PCR Technology</u> , Erlich, H.A., ed., New York, Stockton Press, pp. 61-70 (1989)
AT	
EXAMINER	DATE CONSIDERED

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FORM PTO-1449 (Modified)		Attorney Docket No. 16528J-020600	Serial No.: 08/650,400	PTO 10525 U.S. 09/490643 01/24/00		
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)		Applicant: JEREMY MINSHULL et al.				
		Filing Date: May 20, 1996		Group: Unassigned		
Reference Designation		U.S. PATENT DOCUMENTS				
Examiner Initial	Document No.	Date	Name	Class	Sub-class	Filing Date (If Appropriate)
AA	4,994,368	02/19/91	Goodman, T. et al.	435	6	07/23/87
AB	5,043,272	08/27/91	Hartley, J.L.	435	91	04/27/89
OTHER ART (Including Author, Title, Date, Pertinent Pages, Etc.)						
AC	Andersson, D. et al., "Muller's Ratchet Decreases Fitness of a DNA-based Microbe," <u>Proc. Natl. Acad. Sci. U.S.A.</u> 93:906-907 (1996).					
AD	Barrett, M. et al., "Genotypic Analysis of Multiple Loci in Somatic Cells by Whole Genome Amplification," <u>Nucleic Acids Research</u> 23:3488-3492 (1995).					
AE	Crameri, A. et al., "Improved Green Fluorescent Protein by Molecular Evolution Using DNA Shuffling," <u>Nature Biotechnology</u> 14:315-319 (1996).					
AF	Crameri, A. et al., "Construction and Evolution of Antibody-phage Libraries by DNA Shuffling," <u>Nature Medicine</u> 2:100-300 (1996).					
AG	Feinberg, A. et al., "A Technique for Radiolabeling DNA Restriction Endonuclease Fragments to High Specific Activity," <u>Analytical Biochemistry</u> 132:6-13 (1983).					
AH	Ho, S. et al., "Site-directed Mutagenesis by Overlap Extension Using the Polymerase Chain Reaction," <u>Gene</u> 77:51-59 (1989).					
AI	Horton, R. et al., "Engineering Hybrid Genes Without the Use of Restriction Enzymes: Gene Splicing by Overlap Extension," <u>Gene</u> 77:61-68 (1989).					
AJ	Levichkin, I.V. et al., "A New Approach to Construction of Hybrid Genes: Homolog Recombination Method," <u>Molecular Biology</u> 29:572-577 (1995).					
AK	Pharmacia Catalog, "Recombinant Phage Antibody System: Mouse ScFv Module Expression Module Detection Module," p. 70-71, 1993 Edition.					
AL	Ramos, J.L. et al., "The Behavior of Bacteria Designed for Biodegradation," <u>Bio/Technology</u> 12:1349-1355 (1994).					
AM	Stemmer, W.P.C. et al., "Single-step Assembly of a Gene and Entire Plasmid from Large Numbers of Oligodeoxyribonucleotides," <u>Gene</u> 164:49-53 (1995).					
AN	Stemmer, W.P.C., "Searching Sequence Space: Using Recombination to Search More Efficiently and Thoroughly Instead of Making Bigger Combinatorial Libraries," <u>Bio/Technology</u> 13:549-553 (1995).					
AO	Stemmer, W.P.C., "Rapid Evolution of a Protein <i>In Vitro</i> by DNA Shuffling," <u>Nature</u> 370:389-391 (1994).					
AP	Stemmer, W.P.C., "The Evolution of Molecular Computation," <u>Science</u> 270:1510 (1995).					
AQ	Stemmer, W.P.C., "DNA Shuffling by Random Fragmentation and Reassembly: <i>In Vitro</i> Recombination for Molecular Evolution," <u>Proc. Natl. Acad. Sci. U.S.A.</u> 91:10747-10751 (1994).					
EXAMINER <i>EWZ</i>		DATE CONSIDERED <i>6/29/01</i>				

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FORM PTO-1449 (Modified)

Attorney Docket No.: 18097-014612US

Application No.: 03/621,859

LIST OF PATENTS AND PUBLICATIONS FOR  
APPLICANT'S INFORMATION DISCLOSURE  
STATEMENT (Use several sheets if necessary)

Applicant: Stemmer et al.

Filing Date: March 25, 1996

Group: 1634

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Reference Designation							Filing Date (If Appropriate)
Examiner Initial	Document No.	Date	Name	Class	Sub-class		
AA	5,965,408	10/12/99	Short				
AB	5,958,672	9/28/99	Short				
AC	5,939,250	8/17/99	Short				
AD	5,858,725	1/12/99	Crowe et al.				
AE	5,851,813	12/22/98	Desrosiers				
AF	5,714,316	2/3/98	Weiner et al.				
AG	5,556,772	9/17/96	Sorge et al.				
AH	5,502,167	3/26/96	Waldmann et al.				
AI	5,234,824	8/10/93	Mullis				
AJ	5,187,083	2/16/93	Mullis				
AK	5,176,995	1/5/93	Sninsky et al.				
AL	5,023,171	6/11/91	Ho et al.				
AM	4,965,188	10/23/90	Mullis et al.				
AN	4,800,159	1/24/89	Mullis et al.				
AO	4,683,202	7/28/87	Mullis				

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	Document No.	Date	Country	Class	Sub-class	Translation: (Yes/No)
AP	WO 94/13804	6/23/94	WIPO			
AQ	WO 94/09817	5/11/94	WIPO			
AR	WO 94/03596	2/17/94	WIPO			
AS	WO 93/25237	12/23/93	WIPO			
AT	WO 93/18141	9/16/93	WIPO			
AU	WO 93/16192	8/19/93	WIPO			
AV	WO 93/15208	8/5/93	WIPO			
AW	WO 93/11237	6/10/93	WIPO			
AX	WO 93/06213	4/1/93	WIPO			
AY	WO 93/02191	2/4/93	WIPO			
AZ	WO 92/07075	4/30/92	WIPO			
BA	WO 91/06570	5/16/91	WIPO			
BB	WO 90/14430	11/29/90	WIPO			
BC	EP 552 266	n/a	Europe			

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BD	Atreya et al., "Construction of in-frame chimeric plant genes by simplified PCR strategies," <u>Plant Mol. Biol.</u> , 19:517-522 (1992).
BE	Bock et al., "Selection of single-stranded DNA molecules that bind and inhibit human thrombin," <u>Nature</u> , 355:564-566 (February 2, 1992).

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LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)		Applicant: Stemmer et al.	
		Filing Date: March 25, 1996	Group: 1634
<input checked="" type="checkbox"/> BF	Clackson et al., "Making antibody fragments using phage display libraries," <u>Nature</u> , 352:624-628 (August 15, 1991).		
<input type="checkbox"/> BG	Crameri et al., "10(20)-Fold aptamer library amplification without gel purification," <u>Nuc. Acids Res.</u> , 21(18):4410 (1993).		
<input type="checkbox"/> BH	Cull et al., "Screening for receptor ligands using large libraries of peptides linked to the C terminus of the <i>lac</i> repressor," <u>PNAS</u> , 89:1865-1869 (March 1992).		
<input type="checkbox"/> BI	Cwirla et al., "Peptides on phage: A vast library of peptides for identifying ligands," <u>PNAS</u> , 87:6378-6382 (August 1990).		
<input type="checkbox"/> BJ	Daugherty et al., "Polymerase chain reaction facilitates the cloning, CDR-grafting, and rapid expression of a murine monoclonal antibody directed against the CD18 component of leukocyte integrins," <u>Nuc. Acids Res.</u> , 19(9):2471-2476 (1991).		
<input type="checkbox"/> BK	Delagrave et al., "Searching Sequence Space to Engineer Proteins: Exponential Ensemble Mutagenesis," <u>Biotechnology</u> , 11:1548-1552 (December 1993).		
<input type="checkbox"/> BL	Dube et al., "Artificial mutants Generated by the Insertion of Random Oligonucleotides into the Putative Nucleoside Binding Site of the HSV-1 Thymidine Kinase Gene," <u>Biochemistry</u> , 30(51):11760-11767 (1991).		
<input type="checkbox"/> BM	Ghosh et al., "Arginine-395 Is Required for Efficient <i>in Vivo</i> and <i>in Vitro</i> Aminoacylation of tRNAs by <i>Escherichia coli</i> Methionyl-tRNA Synthetase," <u>Biochemistry</u> , 30:11767-11774 (1991).		
<input type="checkbox"/> BN	Goldman et al., "An Algorithmically Optimized Combinatorial Library Screened by digital Imaging Spectroscopy," <u>Biotechnology</u> , 10:1557-1561 (December 1992).		
<input type="checkbox"/> BO	Harlow et al., "Construction of Linker-Scanning Mutations using the Polymerase Chain Reaction," <u>Methods in Mol. Biol.</u> , 31:87-96 (1994).		
<input type="checkbox"/> BP	Heda et al., "A simple <i>in vitro</i> site directed mutagenesis of concatamerized cDNA by inverse polymerase chain reaction," <u>Nuc. Acids Res.</u> , 20(19):5241-5242 (1992).		
<input type="checkbox"/> BQ	Ho et al., "DNA and Protein Engineering Using the Polymerase Chain Reaction: Splicing by Overlap Extension," <u>DNA and Protein Eng. Techniques</u> , 2(2):50-55 (1990).		
<input type="checkbox"/> BR	Hodgson, "The Whys and Wherefores of DNA Amplification," <u>Biotechnology</u> , 11:940-942 (August 1993).		
<input type="checkbox"/> BS	Horton et al., "Gene Splicing by Overlap Extension," <u>Methods in Enzymology</u> , 217:270-279 (1993).		
<input type="checkbox"/> BT	Horton et al., "Gene Splicing by Overlap Extension: Tailor-Made Genes Using the Polymerase chain Reaction," <u>BioTechniques</u> , 8(5):528-535 (May 1990).		
<input type="checkbox"/> BU	Jayaraman et al., "Polymerase chain reaction-mediated gene synthesis: Synthesis of a gene coding for isozyme c of horseradish peroxidase," <u>PNAS</u> , 88:4084-4088 (May 1991).		
<input type="checkbox"/> BV	Jones et al., "A Rapid Method for Recombination and Site-Specific Mutagenesis by Placing Homologous ends on DNA Using Polymerase Chain Reaction," <u>BioTechniques</u> , 10(1): 62-66 (1991).		
<input type="checkbox"/> BW	Joyce, G. F., "Directed Molecular Evolution," <u>Scientific American</u> , (December 1992).		
<input type="checkbox"/> BX	Klug et al., "Creating chimeric molecules by PCR directed homologous DNA recombination," <u>Nuc. Acids Res.</u> , 19(10):2793 (1991).		
<input type="checkbox"/> BY	Krishnan et al., "Direct and crossover PCR amplification to facilitate Tn5supF-based sequencing of $\lambda$ phage clones," <u>Nuc. Acids Res.</u> , 19(22):6177-6182 (1991).		
<input type="checkbox"/> BZ	Majumder, K., "Ligation-free gene synthesis by PCR: synthesis and mutagenesis at multiple loci of a chimeric gene encoding OmpA signal peptide and hirudin," <u>Gene</u> , 110:89-94 (1992).		
<input type="checkbox"/> CA	Marks et al., "By-passing Immunization, Human Antibodies from V-gene Libraries Displayed on Phage," <u>J. Mol. Biol.</u> , 222:581-597 (1991).		
<input type="checkbox"/> CB	McCafferty et al., "Phage antibodies: filamentous phage displaying antibody variable domains," <u>Nature</u> , 348:552-554 (December 6, 1990).		
<input type="checkbox"/> CC	Morl et al., "Group II intron RNA-catalyzed recombination of RNA <i>in vitro</i> ," <u>Nuc. Acids Res.</u> , 18(22):6545-6551 (1990).		
<input checked="" type="checkbox"/> CD	Mullis et al., "Specific Synthesis of DNA <i>in Vitro</i> via a Polymerase-Catalyzed Chain Reaction," <u>Methods in Enzymology</u> , 155:335-351 (1987).		

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		Filing Date: March 25, 1996	Group: 1634
<input checked="" type="checkbox"/> CE	Mullis et al., "Specific Enzymatic Amplification of DNA In Vitro: The Polymerase Chain Reaction," Cold Spring Harbor Symposia on Quantitative Biology, 51:263-273 (1986).		
<input type="checkbox"/> CF	Nissim et al., "Antibody fragments from a 'single pot' display library as immunochemical reagents," <u>EMBO Journal</u> , 13(3):692-698 (1994).		
<input type="checkbox"/> CG	Osuna et al., "Combinatorial mutagenesis of three major groove-contacting residues of <i>Eco</i> RI: single and double amino acid replacements retaining methyltransferase-sensitive activities," <u>Gene</u> , 106:7-12 (1991).		
<input type="checkbox"/> CH	Paabo et al., "DNA Damage Promotes Jumping between Templates during Enzymatic Amplification," <u>J. Biol. Chem.</u> , 265(8):4718-4721 (March 15, 1990).		
<input type="checkbox"/> CI	Saiki et al., "Diagnosis of sickle Cell Anemia and $\beta$ -Thalassemia with Enzymatically Amplified DNA and Nonradioactive Allele-Specific Oligonucleotide Probes," <u>New England J. of Medicine</u> , 319(9):537-541 (September 1, 1988).		
<input type="checkbox"/> CJ	Saiki et al., "analysis of enzymatically amplified $\beta$ -globin and HLA-DQ $\alpha$ DNA with allele-specific oligonucleotide probes," <u>Nature</u> , 324:163-166 (November 13, 1986).		
<input type="checkbox"/> CK	Saiki et al., "Enzymatic Amplification of $\beta$ -Globin Genomic Sequences and Restriction Site analysis for Diagnosis of Sickle Cell Anemia," <u>Science</u> , 230:1350-1354 (December 20, 1985).		
<input type="checkbox"/> CL	Saiki et al., "Primer-Directed Enzymatic Amplification of DNA with a Thermostable DNA Polymerase," <u>Science</u> , 239:487-491 (January 20, 1988).		
<input type="checkbox"/> CM	Sambrook et al., <u>Molecular Cloning, A Laboratory Manual</u> , Cold Spring Laboratory Press, Cold Spring Harbor, New York (1989).		
<input type="checkbox"/> CN	Scharf et al., "Direct Cloning and Sequence Analysis of Enzymatically Amplified Genomic Sequences," <u>Science</u> , 233:1076-1078 (September 1986).		
<input type="checkbox"/> CO	Scott et al., "Searching for Peptide Ligands with an Epitope Library," <u>Science</u> , 249:386-390 (July 20, 1990).		
<input type="checkbox"/> CP	Sikorski et al., "In Vitro Mutagenesis and Planned Shuffling: From Cloned Gene to Mutant Yeast," <u>Methods in Enzymology</u> , 194:302-318 (1991).		
<input type="checkbox"/> CQ	Smith et al., "Unwanted Mutations in PCR Mutagenesis: Avoiding the Predictable," <u>PCR Methods and Applications</u> , 2(3):253-257 (February 1993).		
<input type="checkbox"/> CR	Villarreal et al., "A General Method of Polymerase-Chain-Reaction-Enabled Protein Domain Mutagenesis: Construction of a Human Protein S-Osteonectin Gene," <u>Analytical Biochem.</u> , 197:362-367 (1991).		
<input type="checkbox"/> CS	Weisberg et al., "Simultaneous Mutagenesis of Multiple Sites: Application of the Ligase Chain Reaction Using PCR Products Instead of Oligonucleotides," <u>BioTechniques</u> , 15(1):68-70, 72-74, 76 (July 1993).		
<input type="checkbox"/> CT	Weissenhorn et al., "Chimerization of antibodies by isolation of rearranged genomic variable regions by the polymerase chain reaction," <u>Gene</u> , 106:273-277 (1991).		
<input type="checkbox"/> CU	Yao et al., "Site-directed Mutagenesis of Herpesvirus Glycoprotein Phosphorylation Sites by Recombination Polymerase Chain Reaction," <u>PCR Methods and Applications</u> , 1(3):205-207 (February 1992).		
<input type="checkbox"/> CV	Yolov et al., "Constructing DNA by polymerase recombination," <u>Nuc. Acids Res.</u> , 18(13):3983-3986 (1990).		
<input type="checkbox"/> CW	Yon et al., "Precise gene fusion by PCR," <u>Nuc. Acids Res.</u> , 17(12):4895 (1989).		
<input type="checkbox"/> CX	Zoller, M.J., "New recombinant DNA methodology for protein engineering," <u>Curr. Opin. Biotech.</u> , 3:348-354 (1992).		
<input checked="" type="checkbox"/> CY	Opposition Statement in matter of Australian Patent Application 703264 (Affymax Technologies NV), filed by Diversa Corporation on September 23, 1999.		
EXAMINER	DATE CONSIDERED 6/29/01		

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FORM PTO-1449 (Modified)			Attorney Docket No.: 18097-014612US		Application No.: 08/621,859	
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)			Applicant: Stemmer et al.			
			Filing Date: March 25, 1996		Group: 1634	
Reference Designation			U.S. PATENT DOCUMENTS			Page 1
Examiner Initial	Document No.	Date	Name	Class	Sub-class	Filing Date (If Appropriate)
AA	5,679,522	10/21/97	Modrich et al.	7	7	1525 U.S. Pat. & Tm. Off. 08/490643
AB	5,556,750	9/17/96	Modrich et al.			
AC	5,489,523	2/6/96	Mathur			
AD	5,356,801	10/18/94	Rambosek et al.			
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	Document No.	Date	Country	Class	Sub-class	Translation (Yes/No)
OTHER ART (Including Author, Title, Date, Pertinent Pages, Etc.)						
AE	Andersson et al., "Muller's ratchet decreases fitness of a DNA-based microbe", <u>PNAS</u> , 93: 906-907 (January 1996).					
AF	Bailey, "Toward a Science of Metabolic Engineering", <u>Science</u> , 252: 1668-1680 (1991).					
AG	Barrett et al., "Genotypic analysis of multiple loci in somatic cells by whole genome amplification", <u>Nuc. Acids Res.</u> , 23(17): 3488-3492 (1995).					
AH	Cameron et al., "Cellular and Metabolic Engineering An Overview", <u>Applied Biochem. Biotech.</u> , 38: 105-140 (1993).					
AI	Chakrabarty, "Microbial Degradation of Toxic Chemicals: Evolutionary Insights and Practical Considerations", <u>ASM News</u> , 62(3): 130-137 (1996).					
AJ	Chater, "The Improving Prospects for Yield Increase by Genetic Engineering in Antibiotic-Producing Streptomycetes", <u>Biotechnology</u> , 8: 115-121 (February 1990).					
AK	Chen et al., "Tuning the activity of an enzyme for unusual environments: Sequential random mutagenesis of subtilisin E for catalysis in dimethylformamide", <u>PNAS</u> , 90: 5618-5622 (June 1993).					
AL	Dieffenbach et al., <u>PCR Primer, A Laboratory Manual</u> , Cold Spring Harbor Laboratory Press, pgs. 583-589, 591-601, 603-612, and 613-621 (1995).					
AM	Evnin et al., "Substrate specificity of trypsin investigated by using a genetic selection", <u>PNAS</u> , 87: 6659-6663 (September 1990).					
AN	Fang et al., "Human Strand-specific Mismatch Repair Occurs by a Bidirectional Mechanism Similar to That of the Bacterial Reaction", <u>J. Biol. Chem.</u> , 268(16): 11838-11844 (June 5, 1993).					
AO	Ippolito et al., "Structure assisted redesign of a protein-zinc-binding site with femtomolar affinity", <u>PNAS</u> , 92: 5017-5021 (May 1995).					
AP	Kellogg et al., "Plasmid-Assisted Molecular Breeding: New Technique for Enhanced Biodegradation of Persistent Toxic Chemicals", <u>Science</u> , 214: 1133-1135 (December 4, 1981).					
AQ	Kunkel, "Rapid and efficient site-specific mutagenesis without phenotypic selection", <u>PNAS</u> , 82: 488-493 (January 1985).					
AR	Levichkin et al., "A New Approach to Construction of Hybrid Genes: Homolog Recombination Method", <u>Mol. Biology</u> , 29(5) part 1: 572-577 (1995).					
AS	Lewis et al., "Efficient site directed <i>in vitro</i> mutagenesis using ampicillin selection", <u>Nuc. Acids Res.</u> , 18(12): 3439-3443 (1990).					
AT	Moore et al., "Directed evolution of a <i>para</i> -nitrobenzyl esterase for aqueous-organic solvents", <u>Nature Biotech.</u> , 14: 458-467 (April 1996).					
AU	Omura, "Philosophy of New Drug Discovery", <u>Microbiol. Rev.</u> , 50(3): 259-279 (September 1986).					
AV	Piepersberg, "Pathway Engineering in Secondary Metabolite-Producing Actinomycetes", <u>Crit. Rev. Biotech.</u> , 14(3):251-285 (1994).					
AW	Prasher, "Using GFP to see the light", <u>TIG</u> , 11(8) (August 1995).					

FORM PTO-1449 (Modified)		Attorney Docket No.: 18097-014612US	Application No.: 08/621,859
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)		Applicant: Stemmer et al.	
		Filing Date: March 25, 1996	Group: 1634
<input checked="" type="checkbox"/> AX	Rice et al., "Random PCR mutagenesis screening of secreted proteins by direct expression in mammalian cells", <u>PNAS</u> , 89: 5467-5471 (June 1992).		
<input type="checkbox"/> AY	Simpson et al., "Two paradigms of metabolic engineering applied to amino acid biosynthesis", <u>Biochem. Soc. Transactions</u> , vol. 23 (1995).		
<input type="checkbox"/> AZ	Steele et al., "Techniques for Selection of Industrially Important Microorganisms", <u>Ann. Rev. Microbiol.</u> , 45: 89-106 (1991).		
<input type="checkbox"/> BA	Stephanopoulos et al., "Metabolic engineering - methodologies and future prospects", <u>Trends Biotech.</u> 11: 392-396 (1993).		
<input checked="" type="checkbox"/> BB	Stephanopoulos, "Metabolic engineering", <u>Curr. Opin. Biotech.</u> , 5: 196-200 (1994).		
<input type="checkbox"/> BC	Wehmeier, "New multifunctional <i>Escherichia coli</i> - <i>Streptomyces</i> shuttle vectors allowing blue-white screening on XGal plates", <u>Gene</u> , 165: 149-150 (1995).		
EXAMINER <u>40525</u> DATE CONSIDERED <u>6/29/01</u>			

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.


FORM PTO-1449 (Modified)			Attorney Docket No.: 18097-14612		Application No.: 08/621,859	
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)			Applicant: Stemmer et al.			
			Filing Date: March 25, 1996		Group: 1634	
Reference Designation			U.S. PATENT DOCUMENTS			Page 1
Examiner Initial	Document No.	Date	Name	Class	Sub-class	Filing Date (If Appropriate)
FOREIGN PATENT DOCUMENTS						
	Document No.	Date	Country	Class	Sub-class	Translation Yes/No
AA	WO 95/17413	6/29/95	PCT			
OTHER ART (Including Author, Title, Date, Pertinent Pages, Etc.)						
EXAMINER	DATE CONSIDERED					

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JCS25 U.S. PTO  
09/49/643  
01/24/00

FORM PTO-1449 (Modified)			Attorney Docket No.: 18097-14612		Application No.: 08/621,859	
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)			Applicant: Stemmer et al.			
			Filing Date: March 25, 1996		Group: 1634	
Reference Designation			U.S. PATENT DOCUMENTS			Page 1
Examiner Initial	Document No.	Date	Name	Class	Sub-class	Filing Date (If Appropriate)
AA	5,824,485	10/20/98	Thompson et al.	7	7	<div style="writing-mode: vertical-rl; transform: rotate(180deg);">           1535 U.S. P. 09/49/0643 01/24/00         </div>
AB	5,783,431	7/21/98	Peterson et al.			
AC	5,629,179	5/13/97	Mierendorf et al.			
FOREIGN PATENT DOCUMENTS						
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AG	WO 98/41622	9/24/98	PCT			
AH	WO 98/28416	7/2/98	PCT			
AI	WO 98/01581	1/15/98	PCT			
AJ	WO 97/35966	10/2/97	PCT			
AK	WO 97/25410	7/17/97	PCT			
AL	WO 97/20078	6/5/97	PCT			
OTHER ART (Including Author, Title, Date, Pertinent Pages, Etc.)						
AM	Fisch et al., "A Strategy Of Exon Shuffling For Making Large Peptide Repertoires Displayed On Filamentous Bacteriophage", <u>Proc Natl Acad Sci USA</u> , 93(15):7761-7766 (1996)					
AN	Marton et al., "DNA Nicking Favors PCR Recombination", <u>Nucleic Acids Res.</u> , 19(9):2423-2426 (1991)					
AO	Winter et al., "Making Antibodies By Phage Display Technology", <u>Ann. Rev. Immunol.</u> , 12:433-455 (1994)					
AP	Greener et al., "An Efficient Random Mutagenesis Technique Using An E. coli Mutator Strain", <u>Methods in Molecular Biology</u> , 57:375-385 (1995)					
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EXAMINER <i>[Signature]</i>			DATE CONSIDERED 6/29/01			

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LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)			Applicant: Stemmer et al.			
			Filing Date: March 25, 1996		Group: 1634	
Reference Designation			U.S. PATENT DOCUMENTS			Page 1
Examiner Initial	Document No.	Date	Name	Class	Sub-class	Filing Date (If Appropriate)
<u>AA</u>	5,830,721	11/03/98	Stemmer et al.	7	7	JCS25 U.S. PTO 09/490643  01/24/00
<u>AB</u>	5,811,238	09/22/98	Stemmer et al.			
<u>AC</u>	5,763,192	06/09/98	Kauffman et al.			
<u>AD</u>	5,723,323	03/03/98	Kauffman et al.			
<u>AE</u>	5,814,476	09/29/98	Kauffman et al.			
<u>AF</u>	5,817,483	10/06/98	Kauffman et al.			
<u>AG</u>	5,824,514	10/20/98	Kauffman et al.			
<u>AH</u>						
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<u>AO</u>						
<u>AP</u>						
<b>FOREIGN PATENT DOCUMENTS</b>						
	Document No.	Date	Country	Class	Sub-class	Translation (Yes/No)
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EXAMINER	<u>RWZ</u>		DATE CONSIDERED	<u>6/29/01</u>		

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FORM PTO-1449 (Modified)		Attorney Docket No.: 18097-146-1-2		Application No.: 08/621 859		
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)		Applicant: Stemmer et al.				
		Filing Date: March 25, 1996		Group: 1634		
Reference Designation		U.S. PATENT DOCUMENTS				Page 1
Examiner Initial	Document No.	Date	Name	Class	Sub-class	Filing Date (If Appropriate)
AA	5,316,935	05/31/94	Arnold et al.			
AB	5,834,252	11/10/98	Stemmer et al.			
AC	5,837,458	11/17/98	Minshull et al.			
FOREIGN PATENT DOCUMENTS						
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AD	WO 91/07506	05/30/91	PCT			
AE	WO 91/15581	10/17/91	PCT			
AF	WO 91/16427	10/31/91	PCT			
AG	WO 95/22625	08/24/95	PCT			
AH	WO 96/33207	10/24/96	PCT			
OTHER ART (Including Author, Title, Date, Pertinent Pages, Etc.)						
AI	Balint et al., "Antibody Engineering By Parsimonious Mutagenesis", <u>Gene</u> , 137(1):109-118 (1993)					
AJ	Bartel et al., "Isolation of New Ribozymes From a Large Pool of Random Sequences", <u>Science</u> , 261:1411-1418 (1993)					
AK	Cramer et al., "Combinatorial Multiple Cassette Mutagenesis Creates All The Permutations Of Mutant And Wild-Type Sequences", <u>Biotechniques</u> , 18(2):194-196 (1995)					
AL	Cramer et al., "Improved Green Fluorescent Protein By Molecular Evolution Using DNA Shuffling", <u>Nat. Biotechnol.</u> , 14(3):315-319 (1996)					
AM	Cramer et al., "Construction And Evolution Of Antibody-Phage Libraries By DNA Shuffling", <u>Nat. Med.</u> , 2(1):100-102 (1996)					
AN	Cramer et al., "Molecular Evolution Of An Arsenate Detoxification Pathway By DNA Shuffling", <u>Nat. Biotechnol.</u> , 15(5):436-438 (1997)					
AO	Cramer et al., "DNA Shuffling Of A Family Of Genes From Diverse Species Accelerates Directed Evolution", <u>Nature</u> , 391(3664):288-291 (1998)					
AP	Gates et al., "Affinity Selective Isolation Of Ligands From Peptide Libraries Through Display On A Lac Repressor 'Headpiece Dimer'", <u>J. Mol. Biol.</u> , 255(3):373-386 (1996)					
AQ	Gram et al., "In Vitro Selection and Affinity Maturation of Antibodies From a Naïve Combinatorial Immunoglobulin Library", <u>Proc. Natl. Acad. Sci. USA</u> , 89:3576-3580 (1992)					
AR	Near, "Gene Conversion Of Immunoglobulin Variable Regions In Mutagenesis Cassettes By Replacement PCR Mutagenesis", <u>Biotechniques</u> , 12(1):88-97 (1992)					
AS	Perlak, "Single Step Large Scale Site-Directed In Vitro Mutagenesis Using Multiple Oligonucleotides", <u>Nucleic Acids Res.</u> , 18(24):7457-7458 (1990)					
AT	Stemmer, "Searching Sequence Space", <u>Biotechnology</u> , 13:549-553 (1995)					
AU	Stemmer et al., "Single-Step Assembly Of A Gene And Entire Plasmid From Large Numbers Of Oligodeoxyribonucleotides", <u>Gene</u> , 164(1):49-53 (1995)					
AV	Stemmer, "The Evolution of Molecular Computation", <u>Science</u> , 270(5241):1510 (1995)					
AW	Stemmer, "Sexual PCR and Assembly PCR" <u>Encyclopedia Mol. Biol.</u> , VCH Publishers, New York, pp. 447-457 (1996)					
AX	Weber et al., "Formation of Genes Coding for Hybrid Proteins by Recombination Between Related, Cloned Genes in E. Coli", <u>Nucleic Acids Research</u> , 11(16):5661-5669 (1983)					
AY	Weisberg et al., "Simultaneous Mutagenesis Of Multiple Sites: Application Of The Ligase Chain Reaction Using PCR Products Instead Of Oligonucleotides", <u>BioTechniques</u> , 15(1):68-76 (1993)					

FORM PTO-1449 (Modified)		Attorney Docket No.: 18097-146-1-2	Application No.: 08/621,859
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)		Applicant: Stemmer et al.	
		Filing Date: March 25, 1996	Group: 1634
<u>ent</u> AZ	Zhang et al., "Directed Evolution Of A Fucosidase From A Galactosidase By DNA Shuffling And Screening", <u>Proc. Natl. Acad. Sci. USA</u> , 94(9):4504-4509 (1997)		
<u>↓</u> BA	Zhao et al., "Molecular Evolution by Staggered Extension Process (StEP) In Vitro Recombination", <u>Nature Biotech.</u> , 16:258-261 (1998)		
EXAMINER <u>Enders</u>		DATE CONSIDERED <u>6/29/01</u>	

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

FORM PTO-1449 (Modified)

Attorney Docket No.  
018097-014612USSerial No.:  
08/621,859LIST OF PATENTS AND PUBLICATIONS FOR  
APPLICANT'S INFORMATION DISCLOSURE  
STATEMENT

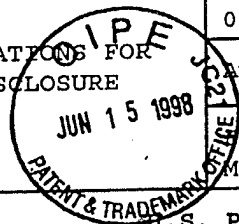
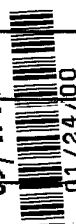
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Applicant: Stemmer and Crameri

Filing Date:  
March 25, 1996Group:  
1807

## Reference Designation

U.S. PATENT DOCUMENTS

JCS25 U.S. PTO  
09/490643

Examiner Initial	Document No.	Date	Name	Class	Sub-class	Filing Date (If Appropriate)
<u>EW</u> AA	4,994,368	02/19/91	Goodman et al.			
AB	5,043,272	08/27/91	Hartley			
AC	5,093,257	03/03/92	Gray			
AD	5,223,408	06/29/93	Goeddel et al.			
AE	5,279,952	01/18/94	Wu			
AF	5,360,728	12/01/94	Prasher			
AG	5,521,077	05/28/96	Khosla et al			
AH	5,541,309	07/30/96	Prasher			
AI	5,605,793	02/25/97	Stemmer			
<u>W</u> AJ	5,652,116	07/29/97	Grandi et al.			

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<u>EW</u> AK	EP 252666 B1	01/13/88	Europe			
AL	WO 90/07576	07/12/90	PCT			
AM	WO 91/01087	02/07/91	PCT			
AN	WO 95/17413	06/29/95	PCT			
<u>W</u> AO	WO 97/07205	02/27/97	PCT			

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<u>EW</u> AP	Arkin et al., "An algorithm for protein engineering: Stimulation of recursive ensemble mutagenesis" <u>Proc. Natl. Acad. Sci. USA</u> 89:7811-7815 (1992).
AQ	Beaudry et al., "Directed evolution of an RNA enzyme" <u>Science</u> 257:635-641 (1992).
<u>W</u> AR	Berger et al. "Phoenix mutagenesis: One-step reassembly of multiply cleaved plasmids with mixtures of mutant and wild-type fragments" <u>Anal. Biochem.</u> 214:571-579 (1993).

EXAMINER

DATE CONSIDERED

4/9/98

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		Group: 1807		525 U.S. PTO 09/490643 01/24/00	
Reference Designation (Including Author, Title, Date, Pertinent Pages, Etc.)					
Examiner Initial					
<input checked="" type="checkbox"/> AS	Berkhout et al. "In vivo selection of randomly mutated retroviral genomes" <u>Nucleic Acids Res.</u> 21:5020-5023 (1993).				
<input type="checkbox"/> AT	Cadwell et al. "Randomization of genes by PCR mutagenesis" <u>PCR Methods and Applications</u> 2:28-33 (1992).				
<input type="checkbox"/> AU	Calogero et al. "In vivo recombination and the production of hybrid genes" <u>Microbiol. Lett.</u> 97:41-44 (1992).				
<input type="checkbox"/> AV	Caren et al. "Efficient sampling of protein sequence space for multiple mutants" <u>Biotechnology</u> 12:517-520 (1994).				
<input type="checkbox"/> AW	Delagrave et al. "Recursive ensemble mutagenesis" <u>Protein Engineering</u> 6:327-331 (1993).				
<input type="checkbox"/> AX	Feinberg and Vogelstein "A technique for radiolabeling DNA restriction endonuclease fragments to high specific activity" <u>Anal. Biochem.</u> 132:6-13 (1983).				
<input type="checkbox"/> AY	Heim et al. "Wavelength mutations and postranslational autoxidation of green fluorescent protein" <u>Proc. Natl. Acad. Sci. USA</u> 91:12501-12504 (1994).				
<input type="checkbox"/> AZ	Hermes et al. "Searching sequence space by definably random mutagenesis: Improving the catalytic potency of an enzyme" <u>Proc. Natl. Acad. Sci. USA</u> 87:696-700 (1990).				
<input type="checkbox"/> AAA	Ho et al. "Site-directed mutagenesis by overlap extension using the polymerase chain reaction" <u>Gene</u> 77:51-59 (1989).				
<input type="checkbox"/> AAB	Horton et al. "Engineering hybrid genes without the use of restriction enzymes: Gene splicing by overlap extension" <u>Gene</u> 77:61-68 (1989).				
<input type="checkbox"/> AAC	Jones et al. "Recombinant circle PCR and recombination PCR for site-specific mutagenesis without PCR product purification" <u>BioTechniques</u> 12:528-530, 532, 534-535 (1992).				
<input type="checkbox"/> AAD	Kim et al. "Human immunodeficiency virus reverse transcriptase" <u>J. Biol. Chem.</u> 271:4872-4878 (1996).				
<input checked="" type="checkbox"/> AAE	Leung et al. "A method for random mutagenesis of a defined DNA segment using a modified polymerase chain reaction" <u>Techniques</u> 1:11-15 (1989).				
EXAMINER			DATE CONSIDERED		7/9/98

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LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)		Applicant: Stemmer and Crameri			
		Filing Date: March 25, 1996		Group: 1807	
Reference Designation (Including Author, Title, Date, Pertinent Pages, Etc.)					
Examiner Initial					
<input checked="" type="checkbox"/> AAF	Marks et al. "By-passing immunization: Building high affinity human antibodies by chain shuffling" <u>Bio/Technology</u> 10:779-782 (1992).				
<input type="checkbox"/> AAG	Meyerhans et al. "DNA recombination using PCR" <u>Nucleic Acids Res.</u> 18:1687-1691 (1990).				
<input type="checkbox"/> AAH	Oliphant et al. "Cloning of random-sequence oligodeoxynucleotides" <u>Gene</u> 44:177-183 (1988).				
<input type="checkbox"/> AAI	Pharmacia Catalog pp. 70-71 (1993 Edition).				
<input type="checkbox"/> AAJ	Pompon et al. "Protein engineering by cDNA recombination in yeasts: Shuffling of mammalian cytochrome P-450 functions" <u>Gene</u> 83:15-24 (1989).				
<input type="checkbox"/> AAK	Reidhaar-Olson et al. "Combinatorial cassette mutagenesis as a probe of the informational content of protein sequences" <u>Science</u> 241:53-57 (1988).				
<input type="checkbox"/> AAL	Roa et al. "Recombination and polymerase error facilitate restoration of infectivity in brome mosaic virus" <u>J. Virol.</u> 67:969-979 (1993).				
<input type="checkbox"/> AAM	Stemmer et al. "Selection of an active single chain Fv antibody from a protein linker library prepared by enzymatic inverse PCR" <u>BioTechniques</u> 14:256-265 (1992).				
<input type="checkbox"/> AAN	Stemmer et al. "Rapid evolution of a protein in vitro by DNA shuffling" <u>Nature</u> 370:389-391 (1994).				
<input checked="" type="checkbox"/> AAO	Stemmer et al. "DNA shuffling by random fragmentation and reassembly: In vitro recombination for molecular evolution" <u>Proc. Natl. Acad. Sci. USA</u> 91:10747-10751 (1994).				
EXAMINER	DATE CONSIDERED 7/9/98				

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# **Notice of References Cited**

Application No.  
08/650,400

Applicant(s)

Minshull et al.

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